a high mind and a kind heart, which are the Greek's most prominent features.

We are well aware that nothing is imperishable on earth, and that our cause is exposed to many dangers. For this reason we appeal to our natural friends for aid that that cause may in no manner be impaired; but we, moreover, know that the only danger we run is that of amalgamating with Russia, to the detriment of our nationality.

Long and exhausting experience instructs us that we can avoid that amalgamation only in one way: by correcting our *international* and *political* condition, on which *entirely* depend our material interests, which *we too* lay a very great stress on.

Our political condition *cannot* be improved without the improvement of the international; the *latter*, therefore, ought to be the object of every thought and every care not only of every Hellene and Philhellene, but also of Western statesmanship, which ought not to allow itself to be biassed and fomented by Turcophilism to view the Cretan insurrection as the result of Russian intrigue, and the wedding of our King as a proof of identity of interests between Russia and Greece.

Luckily for us the advocates of Turcophilism, both here and on the Continent, are so few as to be numbered on our fingers; and their reasoning and endeavours to promote the Turkish cause are so vicious and prejudicial as to remind us of the three country delegates who, having in times immemorial a mission to fulfil, and wishing to appear most dignified, disdained the use of their own feet but not that of mill-horses, the only ones available then in that place; and who, through their stupidity, not only made fools of themselves in the eyes of their constituents witnessing the ludicrous sight of those helpless animals moving circuitously round and round on the same spot, as if they were attached to the mill, but also injured the interests of the whole constituency by pertinaciously insisting upon going *thus* mounted to the capital.

But, leaving Turcophiles to their fate, we feel bound to allege, as regards our attitude and conduct, that no reasonable man can disbelieve us when asserting that all aid (which we are so much in want of) coming to us from a Russian quarter is not half so acceptable as it would be if it came from the west of Europe; and that the accession of a Russian Princess to the Hellenic throne can in no way alter the manifest propensities and vices of the Hellenic nation; for even if there could exist any reason authorising the apprehension that our Queen, notwithstanding the superior gifts she has been endowed with by nature, might be induced to pursue a course different from that which Hellenic interests require, or cherish feelings less liberal than those imbibed from her august kinsmen—the authors of the most liberal act of the age—and from the orthodox religion, whose spirit has caused millions to be now free: the intensity and earnestness of our affection for, and devotion to, all that is great and good, are such as to allow no doubt of their being amply requited by our Queen also, whom we already consider as true a Hellene as our most beloved King is, and, therefore, loving *first* Greece and *then* the friends of Greece. I am, &c., S. I. Cassimati.

Hanover Square, 20th February, 1868.

THE LITERARY EXAMINER.

The Variation of Animals and Plants under Domestication. By Charles Darwin, M.A., F.R.S., &c. John Murray.

Mr Darwin has started a theory with regard to the origin of species in the animate world which has created at least a great amount of sensation among naturalists. His followers regard that theory as furnishing as complete an explanation of all the puzzling phenomena of vegetable and animal life as the theory of gravitation does of the complicated motions of the heavenly bodies.

The theory has been enunciated in a work which only professes to adduce such facts as render it plausible without reaching the force of demonstration. For the latter Mr Darwin requests us to wait, and, if adverse, at least to suspend our judgment until he has the opportunity of laying before us those facts which have been cogent enough to cause him to frame his supposed laws by which the origin of species is effected.

Like Lamark, whose views on this subject were popularised in this country a few years ago by the author of the 'Vestiges of Creation,' he believes that all animate beings may have sprung from a single source—from one single being in which life first flashed into existence. For this idea he claims no originality. What he does claim is the discovery of two simple laws, by which he supposes all the varied forms of animal and vegetable life which now or ever did exist on the earth may have been derived from a single parent; or, if not from one parent, from four or five simple forms for animal life, and from a similar number for the vegetable kingdom. These laws are "inheritance" and "natural selection,"—the law of "inheritance," that any accidental variation of structure occurring in any living being can be transmitted to its progeny; the law of "natural selection," that all animate beings increasing in a geometrical ratio, the numbers of any one of them must speedily reach the point where they will overtake the natural supply of their food. This sooner or later must produce a struggle for existence. In this battle of life any improvement of structure will give its possessor an advantage over its less fortunate brethren. The less improved structures will fall before the more improved. The latter alone will survive and propagate their improved condition by the law of inheritance. In the lapse of time any other accidental variation favourable for victory in the battle of life will be seized on by the stern law of the destruction of the weak by the strong. This law is that which is briefly enunciated in the words "natural selection."

These two laws Mr Darwin considers amply sufficient to account for the origin of species, that is for the most diversified forms of animate beings.

In accordance with the views maintained by me in this work and elsewhere, not only the various domestic races, but the most distinct genera and orders within the same great class,—for instance, whales, mice, birds, and fishes—are all the descendants of one common progenitor, and we must admit that the whole vast amount of difference between these forms of life has primarily arisen from simple variability. To consider the subject under this point of view is enough to strike one dumb with amazement. But our amazement ought to be lessened when we reflect that beings, almost infinite in number, during an almost infinite lapse of time, have often had their whole organisation rendered in some degree plastic, and that each slight modification of structure which was in any way beneficial under excessively complex conditions of life will have been preserved, whilst each which was in any way injurious will have been rigorously destroyed. And the long-continued accumulation of beneficial variations will infallibly lead to structures as diversified, as beautifully adapted for various purposes, and as excellently co-ordinated, as we see in the animals and plants all around us. Hence I have spoken of selection as the paramount power, whether applied by man to the formation of domestic breeds, or by nature to the production of species.

He considers these two laws also sufficient to account for the formation of the most complex organs, without supposing that their admirable fitness for the functions they perform in the animal economy has been in the least degree the result of design, or their special creation for the functions they fulfil with marvellous apparent wisdom. Thus the eye has been formed not in conformity to the laws of optics, but simply by the accidental exposure of a nerve to light. A nerve so exposed, conveying a certain advantageous sensation to its possessor, forms the first step in a long series of variations which, under the influence of the laws of "inheritance" and "natural selection," at last produce such a marvellous optical instrument as the eye. The ear is formed by these laws without any reference to those of acoustics, save that the stern law of natural selection eliminates out of myriads of accidental variations those only which give an acoustic advantage. Nerves, blood-vessels, muscles, brains, hearts, and viscera all owe their origin to the same two laws. And these and these alone are capable of accounting for such instincts as are displayed in the architecture of the bee.

To prove such a theory in spite of the apparent strong improbability suggested by its bare enunciation must be an Herculean task. Mr Darwin does not shrink from it. He undertakes it with enthusiasm, whether he fails or not. The mass of facts he has collected together in his two volumes on 'The Variation of Animals and Plants under Domestication,' and the skilful manner in which they are arranged, must render this work one of the most valuable contributions ever made to the science of natural history. The comparative anatomist and physiologist, the framers of artificial systems of arrangement, without whose aid the pursuit of natural history must be like that of seeking a way through the most intricate conceivable maze,—these, both alike, have paid too little attention to the habits and instincts of the creatures with whose structures they have familiarised themselves.

Horticulturists and breeders of cattle, stimulated by vast pecuniary rewards, have studied parts of the records of life little investigated by the scientific naturalist. Mr Darwin seeks to bring the facts accumulated by these different labourers together with great fairness. He states facts which seem to contradict his theories as freely as those which make for him; though he would be a marvellous exception of human nature if we could not detect a slight leaning of partiality in culling those phenomena which tell best in his favour.

His argument in these volumes is this. Man exercising either an intelligent or sometimes arbitrary power of selection, and thus interfering with the natural propagation of plants and animals, has succeeded in producing such variations that, if scientific naturalists did not know their history, they would pronounce them not only to be different species, but would in many instances class them as distinct genera.

I shall in this volume treat, as fully as my materials permit, the whole subject of variation under domestication. We may thus hope to obtain some light, little though it be, on the causes of variability,—on the laws which govern it, such as the direct action of climate and food, the effects of use and disuse, and of correlation of growth,—and on the amount of change to which domesticated organisms are liable. We shall learn something on the laws of inheritance, on the effects of crossing different breeds, and on that sterility which often supervenes when organic beings are removed from their natural conditions of life, and likewise when they are too closely interbred. During this investigation we shall see that the principle of Selection is all important. Although man does not cause variability and cannot even prevent it, he can select, preserve, and accumulate the variations given to him by the hand of Nature in any way which he chooses: and thus he can certainly produce a great result. Selection may be followed either methodically and intentionally, or unconsciously and unintentionally. Man may select and preserve each successive variation, with the distinct intention of improving and altering a breed, in accordance with a preconceived idea; and by thus adding up variations, often so slight as to be imperceptible by an uneducated eye, he has effected wonderful changes and improvements. It can, also, be clearly shown that man, without any intention or thought of improving the breed, by preserving in each successive generation the individuals which he prizes most, and by destroying the worthless individuals, slowly, though surely, induces great changes. As the will of man thus comes into play, we can understand how it is that domesticated breeds show adaptation to his wants and pleasures. We can further understand how it is that domestic races of animals and cultivated races of plants often exhibit an abnormal character, as compared with natural species; for they have been modified not for their own benefit, but for that of man.

The two volumes before us profess to carry us no further in Mr Darwin's proof of his theory than the power of man's selection, aided by the law of inheritance, in producing what he maintains to be new species.

The exposition of the way in which Nature does the same kind of work he reserves to a future occasion. Reasonably enough, if we take into account the prodigious number of facts and the great difficulties his arguments will have to deal with.

This problem of the conversion of varieties into species,—that is, the augmentation of the slight differences characteristic of varieties into the greater differences characteristic of species and genera, including the admirable adaptations of each being to its complex organic and inorganic conditions of life,—will form the main subject of my second work. We shall therein see that all organic beings, without exception, tend to increase at so high a ratio, that no district, no station, not even the whole surface of the land or the whole ocean, would hold the progeny of a single pair after a certain number of generations. The inevitable result is an ever-recurrent Struggle for Existence. It has truly been said that all nature is at war; the strongest ultimately prevail, the weakest fail; and we well know that myriads of forms have disappeared from the face of the earth. If then organic beings in a state of nature vary even in a slight degree, owing to changes in the surrounding conditions, of which we have abundant geological evidence, or from any other cause; if, in the long course of ages, inheritable variations ever arise in any way advantageous to any being under its excessively complex and changing relations of life; and it would be a strange fact if beneficial variations did never arise, seeing how many have arisen which man has taken advantage of for his own profit or pleasure; if then these contingencies ever occur, and I do not see how the probability of their occurrence can be doubted, then the severe and often-recurrent struggle for existence will determine that those variations, however slight, which are favourable shall be preserved or selected, and those which are unfavourable shall be destroyed.

No extracts can convey to our readers any idea of the rich store of facts contained in these volumes. Mr Darwin is well known as a most accomplished naturalist. He, like Humboldt, has been a diligent observer of Nature in the most remote parts of the earth, under the most diverse conditions of existence. In the pursuit of his theory he has made the most varied experiments upon animate beings, vegetable as well as animal, that his ingenuity could devise. He has sought for information from every source written or unwritten where he could hope to cull a single fact or argument. These arranged in lucid order, and tinged with his own enthusiasm, will make his present work the most popular one hitherto devoted to any branch of natural history. The first volume follows a very easy and natural order of arrangement.

He devotes a chapter or part of a chapter to the history of the changes man has produced by cultivation or breeding in certain well-known domestic plants and animals. Dogs, cats, horses, asses, pigs, cattle, sheep, goats, rabbits, pigeons, fowls, singing birds, hive bees and silk moths, and all the principal cultivated plants and trees are passed in review: the wild species from which they were derived, the changes not only in external appearance but even in anatomical structure are treated with great minuteness, skill, and learning. The varied means by which these changes have been effected are treated with great clearness. The second volume contains treatises on more general subjects: all the varied and variable phenomena of inheritance—the propagation of apparently trifling variations, hereditary diseases, hereditary character of such abnormal growths as additional fingers and toes, weak and fluctuating character of inheritance in some cases, and the non-inheritance of peculiarities at all in others. Then follows an exhaustive dissertation on atavism, or reversion; that is, the law by which the peculiarities of a grandfather or frequently a more remote progenitor, after lying dormant through one or more generations, reappear. The influence of sex, or the potency of one individual rather than another, to modify the character of the progeny; the effects of crossing, the influence of too close breeding, the varied phenomena of hybridism, sterility or fecundity under certain conditions of external nature, the adaptability of creatures to change of climate, the power of man's selection, the causes of variability,—all these subjects are treated with the pen of a master.

In a theoretical point of view the chapter on what Mr Darwin calls Pangenesis will perhaps excite the most attention.

No one can read these two volumes without feeling that the author is conscious that his two laws of variation and natural selection are insufficient to account for the phenomena of life, the origin of species, and the origin of the varied structures existing in the same individual.

The phenomena of reversion, or atavism, the reappearance after perhaps a thousand generations of a structure belonging to a remote ancestor, call for another law. This law Mr Darwin supplies as a provisional hypothesis under the name of Pangenesis. The law is purely hypothetical. In brief it may be stated as follows: every animate being, animal or vegetable, is built up of what may be called units of structure, or cells. Each of these units possesses the power of generating hypothetical granules, to be called for the sake of clearness gemmules. These gemmules when propagated are distributed throughout the whole structure and find their way by a kind of elective affinity to the reproductive organs. In plants and animals not only the gemmules from every particular structure of the parent, but latent gemmules from a whole series of progenitors, are all stored up in the pollen of the male and the ovule of the female flower, and the corresponding organs of animal life. These being united, the gemmules build up the structure of the new plant or animal, and the units so constructed propagate a fresh crop of gemmules. And so on *ad infinitum*. This provisional theory of Pangenesis is invented to give a show of explanation for the admitted law of atavism or the tendency of man's artificial changes of animate structure to revert to the structure first changed

by him, a law after all the most opposed to the formation of all animate beings from one or a few centres of creation by the laws of variation and selection, even admitting them to be as potent as Mr Darwin thinks they are.

How Mr Darwin can make this theory of Pangenesis square with his first theory surpasses our powers of comprehension. He thinks this theory necessary to account for hereditary formations, whether normal or abnormal, healthy or diseased. Without it he cannot account for a one-armed or one-legged parent having two-armed or two-legged offspring. Without it he cannot account for the carrier, tumbler, fantailed, or trumpeter pigeon, perversely, in spite of all man's careful selection, reverting to the plumage of its distant progenitor, the wild rock-pigeon. But surely the necessity for this new theory shows something faulty in the old. If the theory of Pangenesis be necessary to account for the hereditary transmission of structure, it must necessarily go still farther. The original germ, from which the whole class of the vertebrata are supposed on the first hypothesis to have descended, must have contained in itself the gemmules of all the varied structures which have manifested themselves in its descendants. In other words, while abandoning the hypothesis of a large number of centres of creation capable of transmitting their peculiarities of structure and varying within certain limits, Pangenesis shifts the world only on to the elephant's back, and explains the mystery of several creations by the creation of myriads of constructive gemmules.